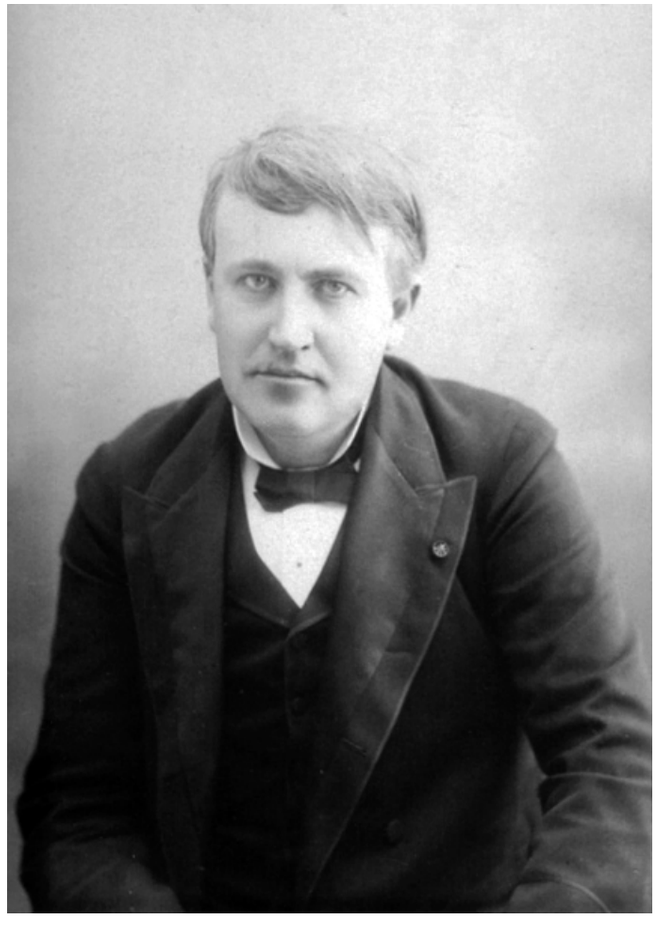
**I’d put my money on the Sun and Solar Energy, what a source of Power! I hope we don’t have to wait until oil and coal run out, before we tackle that.**

**Thomas Edison**



Arizona State University
SES 194

# Energy in Everyday Life

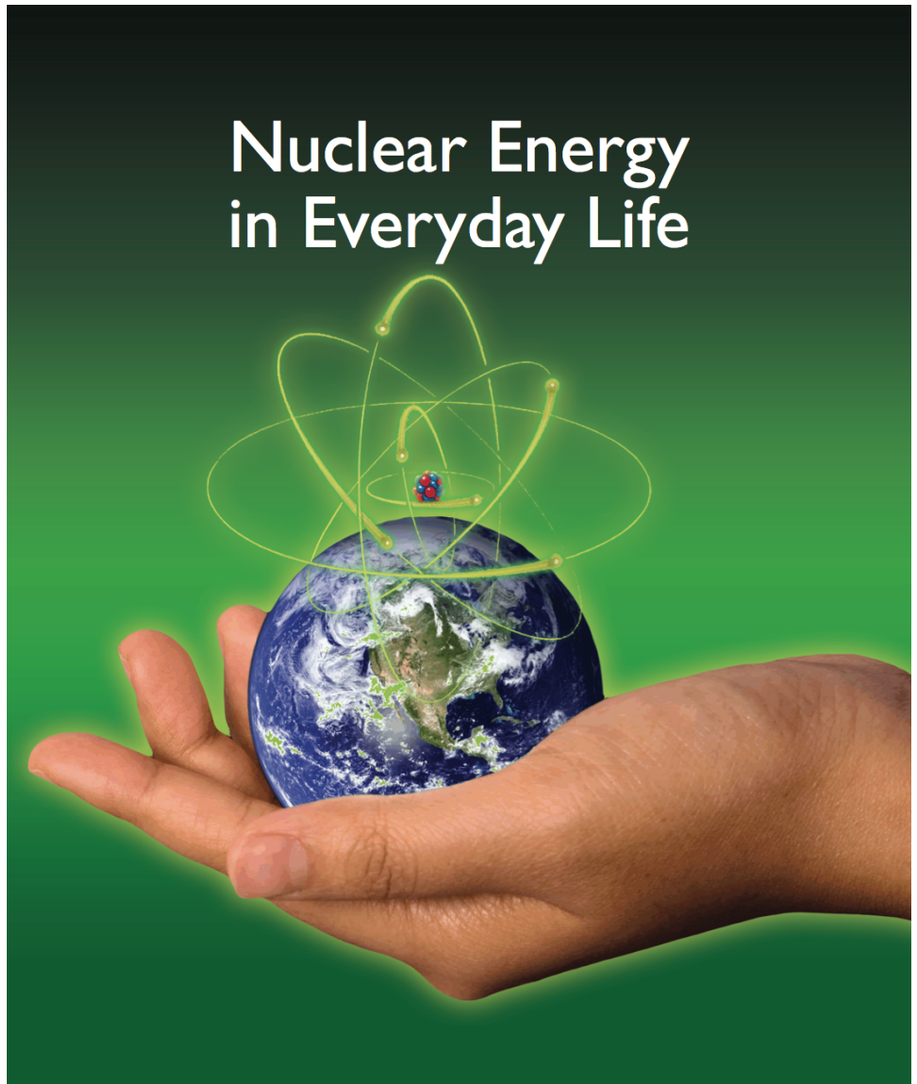
## Sources Of Radioactivity

**Frank Timmes**

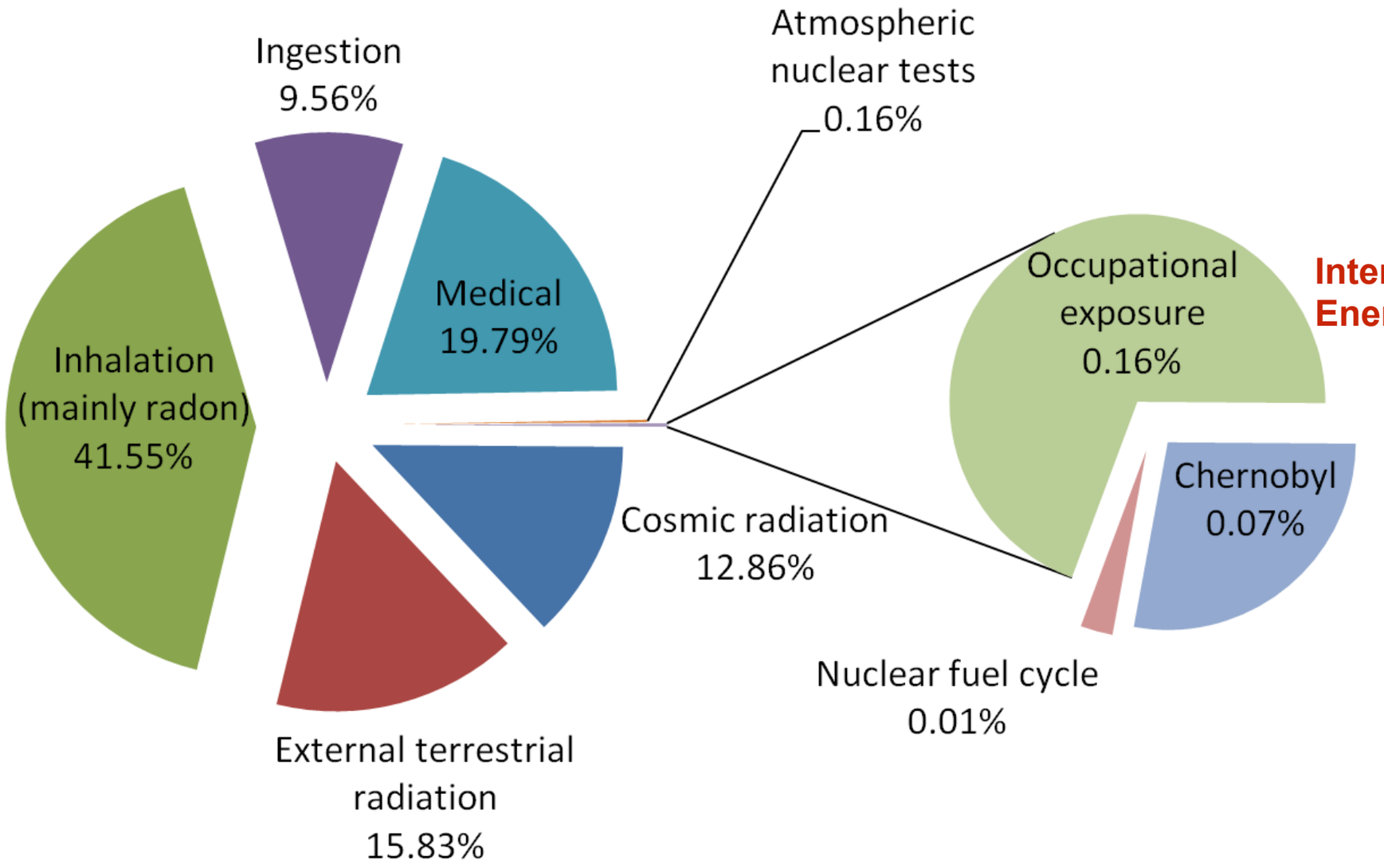
**ftimmes@asu.edu**

**Radioactive decay is used in energy generation, medicine, manufacturing, agriculture, environmental, engineering, science, as well as safety in our homes.**

**Radiation energy is an integral part of daily life.**
**Let's look at the pieces that impact us everyday.**



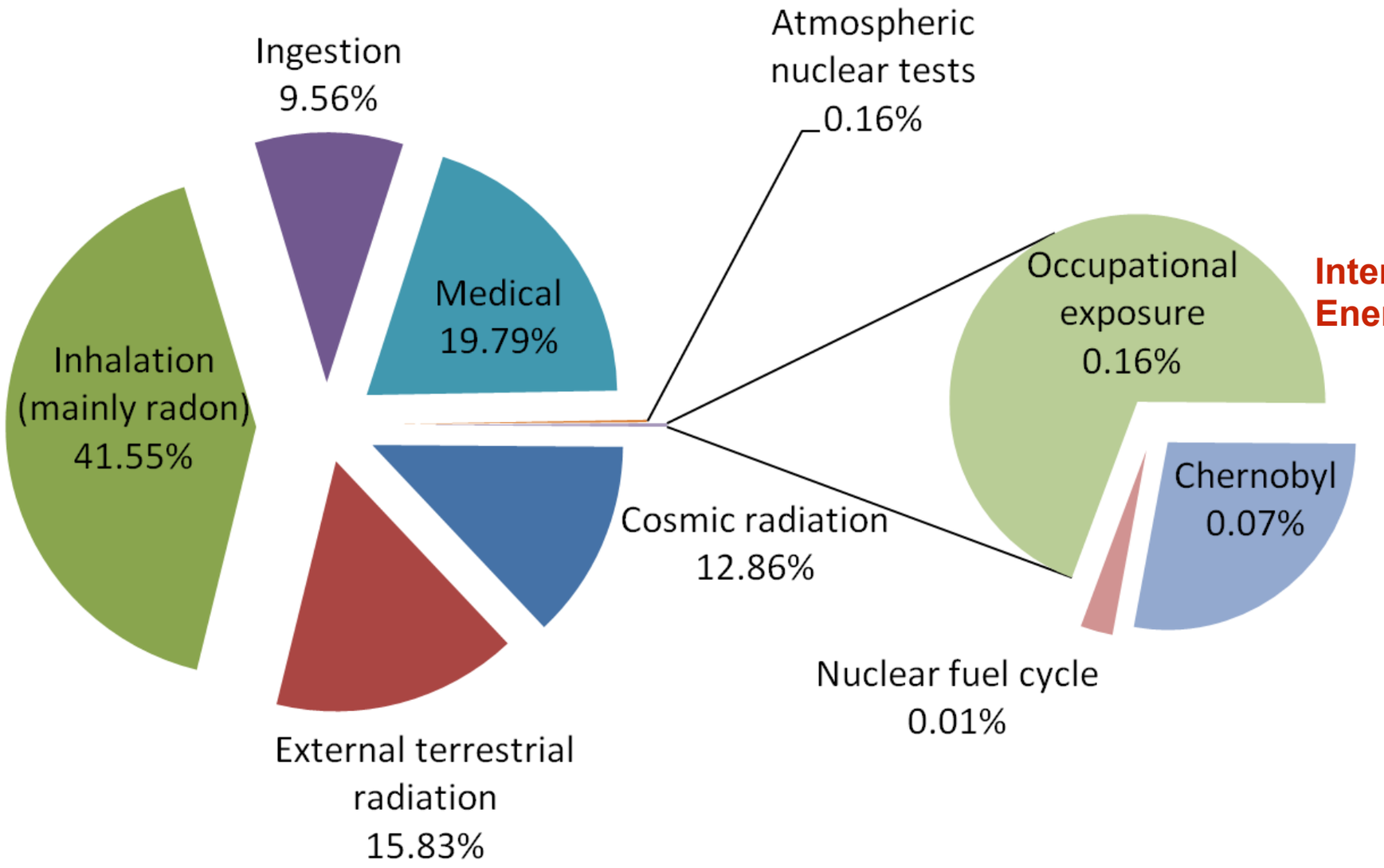
# Cosmic: The sun and stars send a constant stream of cosmic radiation to earth, like a steady drizzle of rain.




International Atomic Energy Agency, 2014.

**Differences in elevation, atmospheric conditions, and the earth's magnetic field can change the amount (or dose) of cosmic radiation that we receive. Frequent fliers …**

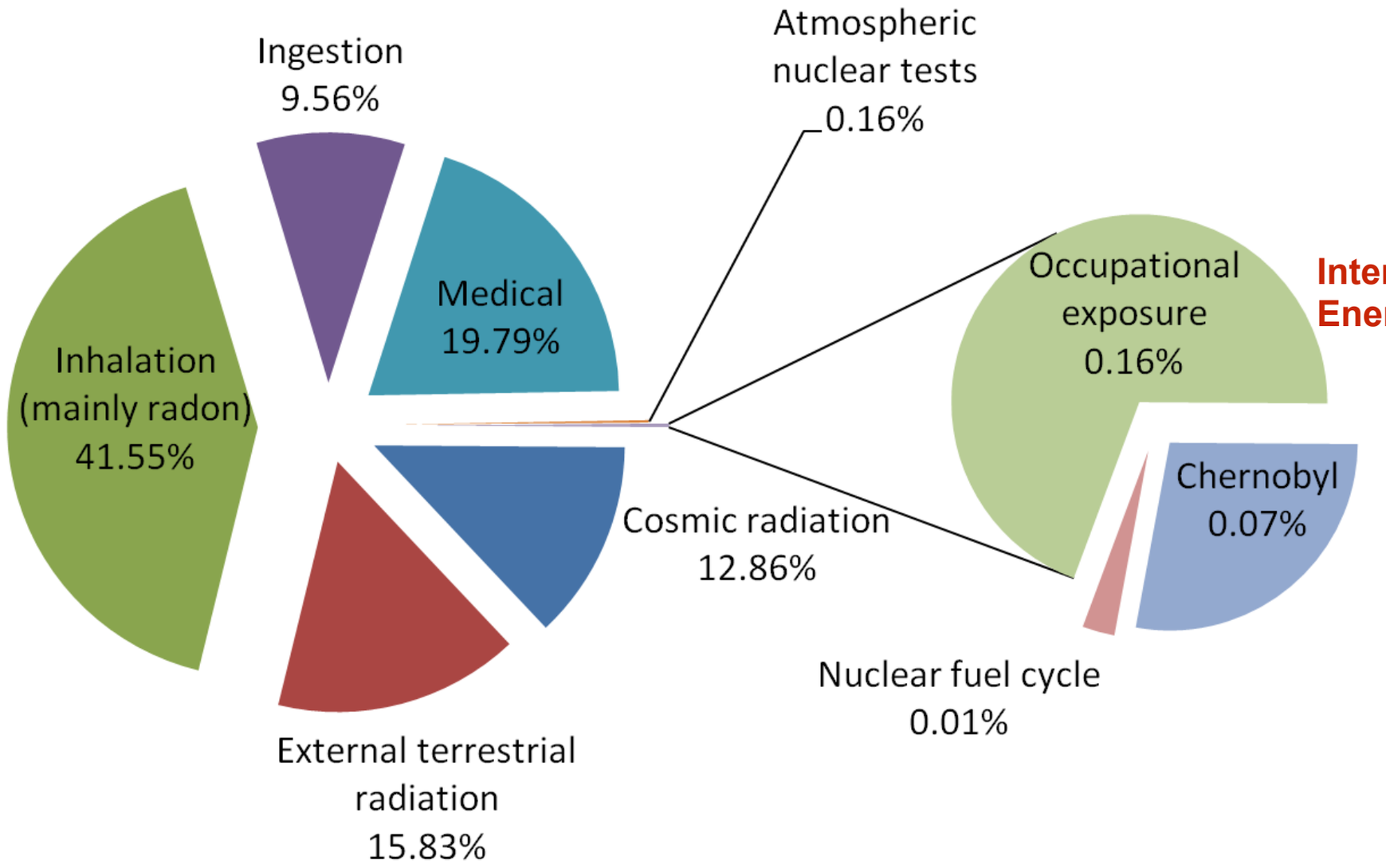
# Terrestrial: The earth itself is a source of terrestrial radiation.




**International Atomic Energy Agency, 2014.**

**Radioactive nuclei (including uranium, thorium, and radium) exist in soil, water and rock. Our buildings, made from the earth, are the largest dose in this category for most people.**

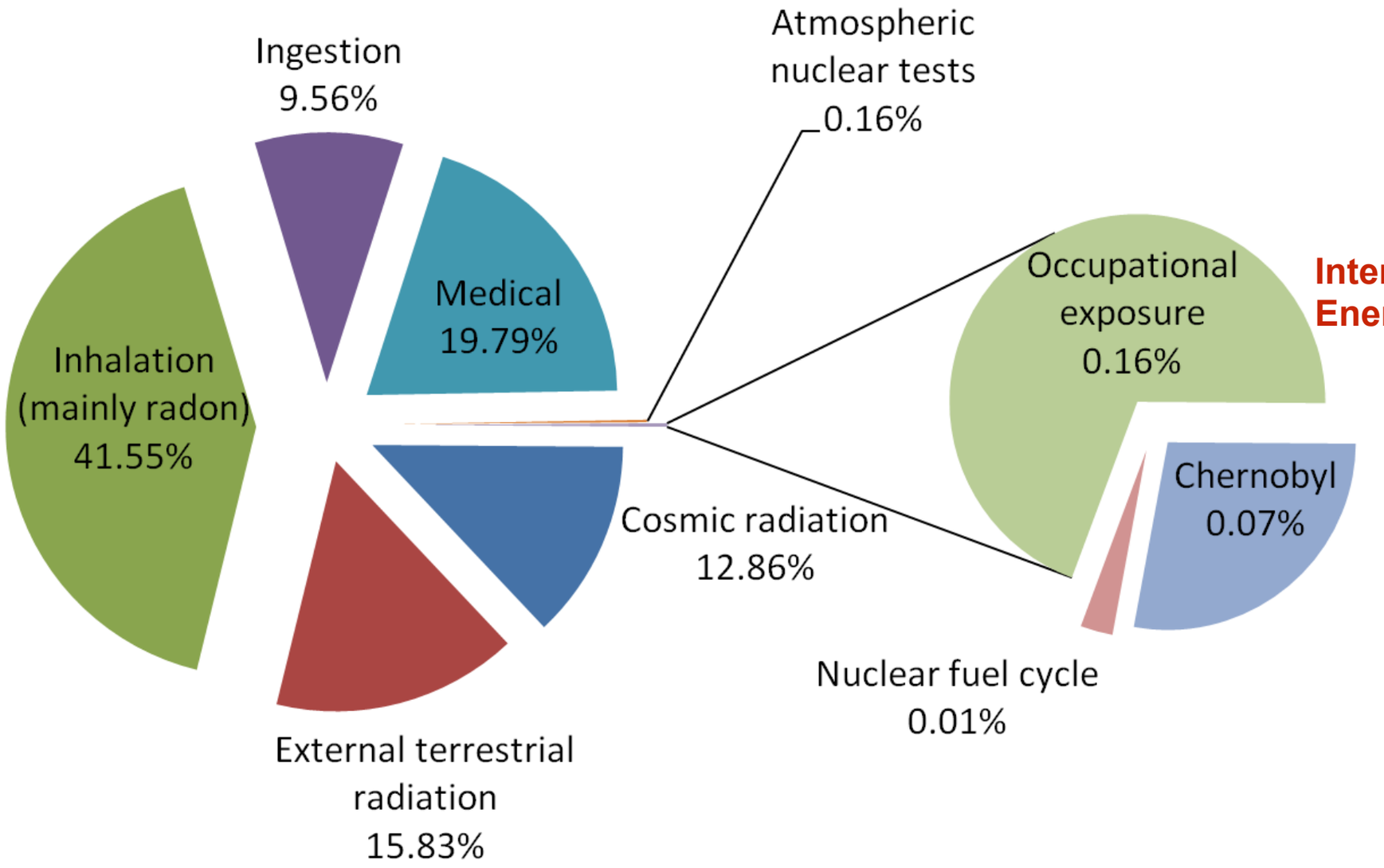
# Atmospheric: All air contains radon, which accounts for most of the dose that people receive each year.




International Atomic Energy Agency, 2014.

**All organic matter (plants and animals) contains radioactive carbon-14 and potassium-40. Bananas are rich in potassium.**

**Medical procedures such as diagnostic x-rays, nuclear medicine, and radiation therapy is by far the largest source of man-made radiation exposure.**




International Atomic Energy Agency, 2014.

**In 1986, Chernobyl operators made key mistakes as the reactor was powering down for routine maintenance.**

**They disabled the emergency cooling system (a blatant violation of safety regulations), withdrew the control rods, and powered off the cooling pumps.**

**The reactor melted down which caused a steam explosion that ripped open the reactor vessel. This exposed the core which led to major radioactive release.**